

# OpenGL<sup>®</sup>

## Programming Guide

*Ninth Edition*

*The Official Guide to Learning  
OpenGL<sup>®</sup>, Version 4.5 with SPIR-V*



John Kessenich • Graham Sellers • Dave Shreiner

The Khronos OpenGL ARB Working Group

# OpenGL Programming Guide 7th Edition

**N Colangelo**



## **OpenGL Programming Guide 7th Edition:**

**OpenGL Programming Guide** Dave Shreiner, The Khronos OpenGL ARB Working, 2009-07-21 Please note that this title's color insert referred to as Plates within the text is not available for this digital product OpenGL is a powerful software interface used to produce high quality computer generated images and interactive applications using 2D and 3D objects bitmaps and color images The OpenGL Programming Guide Seventh Edition provides definitive and comprehensive information on OpenGL and the OpenGL Utility Library The previous edition covered OpenGL through Version 2.1 This seventh edition of the best selling red book describes the latest features of OpenGL Versions 3.0 and 3.1 You will find clear explanations of OpenGL functionality and many basic computer graphics techniques such as building and rendering 3D models interactively viewing objects from different perspective points and using shading lighting and texturing effects for greater realism In addition this book provides in depth coverage of advanced techniques including texture mapping antialiasing fog and atmospheric effects NURBS image processing and more The text also explores other key topics such as enhancing performance OpenGL extensions and cross platform techniques This seventh edition has been updated to include the newest features of OpenGL Versions 3.0 and 3.1 including Using framebuffer objects for off screen rendering and texture updates Examples of the various new buffer object types including uniform buffer objects transform feedback buffers and vertex array objects Using texture arrays to increase performance when using numerous textures Efficient rendering using primitive restart and conditional rendering Discussion of OpenGL's deprecation mechanism and how to verify your programs for future versions of OpenGL This edition continues the discussion of the OpenGL Shading Language GLSL and explains the mechanics of using this language to create complex graphics effects and boost the computational power of OpenGL The OpenGL Technical Library provides tutorial and reference books for OpenGL The Library enables programmers to gain a practical understanding of OpenGL and shows them how to unlock its full potential Originally developed by SGI the Library continues to evolve under the auspices of the Khronos OpenGL ARB Working Group an industry consortium responsible for guiding the evolution of OpenGL and related technologies

[OpenGL Programming Guide](#) Dave Shreiner, 2010 OpenGL is a powerful software interface used to produce high quality computer generated images and interactive applications using 2D and 3D objects bitmaps and color images The OpenGL Programming Guide Seventh Edition provides definitive and comprehensive information on OpenGL and the OpenGL Utility Library The previous edition covered OpenGL through Version 2.1 This seventh edition of the best selling red book describes the latest features of OpenGL Versions 3.0 and 3.1 You will find clear explanations of OpenGL functionality and many basic computer graphics techniques such as building and rendering 3D models interactively viewing objects from different perspective points and using shading lighting and texturing effects for greater realism In addition this book provides in depth coverage of advanced techniques including texture mapping antialiasing fog and atmospheric effects NURBS image processing and more The text also explores other key topics

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will serve you for as long as you write or maintain OpenGL code This edition of the best selling Red Book fully integrates shader techniques alongside classic function centric approaches and contains extensive code examples that demonstrate modern techniques Starting with the fundamentals its wide ranging coverage includes drawing color pixels fragments transformations textures framebuffers light and shadow and memory techniques for advanced rendering and nongraphical applications It also offers discussions of all shader stages including thorough explorations of tessellation geometric and compute shaders New coverage in this edition includes Thorough coverage of OpenGL 4 5 Direct State Access DSA which overhauls the OpenGL programming model and how applications access objects Deeper discussions and more examples of shader functionality and GPU processing reflecting industry trends to move functionality onto graphics processors Demonstrations and examples of key features based on community feedback and suggestions Updated appendixes covering the latest OpenGL libraries related APIs functions variables formats and debugging and profiling techniques OpenGL Programming Guide ,2007 *OpenGL Library* Dave Shreiner,Randi J. Rost,Bill Licea-Kane,2009-07 This boxed set includes The best selling OpenGL Programming Guide Seventh Edition which covers the latest releases of OpenGL Versions 3 0 and 3 1 and includes a 16 page color insert This is the definitive guide to graphics programming with OpenGL the platform independent standard for professional quality 3D graphics The popular OpenGL Shading Language Third Edition which addresses the more integrated nature of the shading language in OpenGL 3 0 and 3 1 with key coverage of special shading techniques light and shading techniques light and shadow shaders and multipass shaders Plus A bonus schematic poster of the OpenGL Machine for both the 3 0 and 3 1 versions of OpenGL 032163764X 9780321637642 OpenGL Library 7 e Package consists of 0321552628 9780321552624 OpenGL Programming Guide The Official Guide to Learning OpenGL Versions 3 0 and 3 1 7 e 0321637631 9780321637635 OpenGL Shading Language 3 e 0321660609 9780321660602 OpenGL Library Poster 2 e 0321670124 9780321670120 OpenGL Library Fifth Edition slipcase 5 e **OpenGL Programming Guide : the Official Guide to Learning OpenGL, Version 4.3** ,2013 *OpenGL Programming Guide* Dave Shreiner,Graham Sellers,John Kessenich,Bill Licea-Kane,2013-03-19 Includes Complete Coverage of the OpenGL Shading Language Today s OpenGL software interface enables programmers to produce extraordinarily high quality computer generated images and interactive applications using 2D and 3D objects color images and programmable shaders OpenGL Programming Guide The Official Guide to Learning OpenGL Version 4 3 Eighth Edition has been almost completely rewritten and provides definitive comprehensive information on OpenGL and the OpenGL Shading Language This edition of the best selling Red Book describes the features through OpenGL version 4 3 It also includes updated information and techniques formerly covered in OpenGL Shading Language the Orange Book For the first time this guide completely integrates shader techniques alongside classic functioncentric techniques Extensive new text and code are presented demonstrating the latest in OpenGL programming techniques OpenGL Programming Guide Eighth Edition provides clear explanations of OpenGL functionality

and techniques including processing geometric objects with vertex tessellation and geometry shaders using geometric transformations and viewing matrices working with pixels and texture maps through fragment shaders and advanced data techniques using framebuffer objects and compute shaders New OpenGL features covered in this edition include Best practices and sample code for taking full advantage of shaders and the entire shading pipeline including geometry and tessellation shaders Integration of general computation into the rendering pipeline via compute shaders Techniques for binding multiple shader programs at once during application execution Latest GLSL features for doing advanced shading techniques Additional new techniques for optimizing graphics program performance **Expert Android** Satya

Komatineni,Dave MacLean,2013-08-24 From the leading publisher of Android books Apress Expert Android gives you advanced techniques for customizing views controls and layouts You ll learn to develop apps in record time using JSON Advanced Form Processing and the BaaS Backend As A Service platform Parse The book also includes extensive coverage on OpenGL Search and Telephony With these advanced and time saving technologies you ll be able to release compelling mobile applications in Google Play and the Amazon Appstore at a rapid pace In Expert Android you ll learn to Borrow reuse or build custom Android UI components Create 3D experiences using OpenGL ES 2 0 Write collaborative applications in the Parse cloud and communicate with your app user community through Parse Push Technology Reduce the time to market while creating rock solid apps for multiple devices Whether you are an individual or enterprise developer in Expert Android you ll find the advanced techniques and practices to take your mobile apps to the next level Regardless of the Android release this book serves as your definitive capstone reference for your Apress Android experience **OpenGL Programming Guide**

Dave Shreiner,OpenGL Architecture Review Board,2006 OpenGL runs on any platform has many supporting tools and applications and is used to create powerful graphic applications This new edition will provide basic information about GLSL itself as well as all the other changes to the 1 5 and 1 0 versions **OpenGL Programming Guide** Dave Shreiner,OpenGL Architecture Review Board,2004 Fully updated for OpenGL Versions 1 3 and 1 4 with many new example programs and colour slides bull Introduces the new shading technologies including the ARB vertex and fragment program extension bull Written under the auspices of the OpenGL Architectural Review Board the previous edition alone has sold more than 40 000 copies **Introduction to Visual Computing** Aditi Majumder,M. Gopi,2018-01-31 Introduction to Visual Computing Core

Concepts in Computer Vision Graphics and Image Processing covers the fundamental concepts of visual computing Whereas past books have treated these concepts within the context of specific fields such as computer graphics computer vision or image processing this book offers a unified view of these core concepts thereby providing a unified treatment of computational and mathematical methods for creating capturing analyzing and manipulating visual data e g 2D images 3D models Fundamentals covered in the book include convolution Fourier transform filters geometric transformations epipolar geometry 3D reconstruction color and the image synthesis pipeline The book is organized in four parts The first part provides

an exposure to different kinds of visual data e g 2D images videos and 3D geometry and the core mathematical techniques that are required for their processing e g interpolation and linear regression The second part of the book on Image Based Visual Computing deals with several fundamental techniques to process 2D images e g convolution spectral analysis and feature detection and corresponds to the low level retinal image processing that happens in the eye in the human visual system pathway The next part of the book on Geometric Visual Computing deals with the fundamental techniques used to combine the geometric information from multiple eyes creating a 3D interpretation of the object and world around us e g transformations projective and epipolar geometry and 3D reconstruction This corresponds to the higher level processing that happens in the brain combining information from both the eyes thereby helping us to navigate through the 3D world around us The last two parts of the book cover Radiometric Visual Computing and Visual Content Synthesis These parts focus on the fundamental techniques for processing information arising from the interaction of light with objects around us as well as the fundamentals of creating virtual computer generated worlds that mimic all the processing presented in the prior sections The book is written for a 16 week long semester course and can be used for both undergraduate and graduate teaching as well as a reference for professionals [OpenGL Programming Guide](#) Dave Shreiner,OpenGL Architecture Review Board,2008

OpenGL Programming Guide Sixth Edition OpenGL is a powerful software interface used to produce high quality computergenerated images and interactive applications using 2D and 3D objects bitmaps and color images The OpenGL Programming Guide Sixth Edition provides definitive and comprehensive information on OpenGL and the OpenGL Utility Library The previous edition covered OpenGL through Version 2 0 This sixth edition of the best selling red book describes the latest features of OpenGL Version 2 1 You will find clear explanations of OpenGL functionality and many basic computer graphics techniques such as building and rendering 3D models interactively viewing objects from different perspective points and using shading lighting and texturing effects for greater realism In addition this book provides in depth coverage of advanced techniques including texture mapping antialiasing fog and atmospheric effects NURBS image processing and more The text also explores other key topics such as enhancing performance OpenGL extensions and cross platform techniques This sixth edition has been updated to include the newest features of OpenGL Version 2 1 including Using server side pixel buffer objects for fast pixel rectangle download and retrieval Discussion of the sRGB texture format Expanded discussion of the OpenGL Shading Language This edition continues the discussion of the OpenGL Shading Language GLSL and explains the mechanics of using this language to create complex graphics effects and boost the computational power of OpenGL The OpenGL Technical Library provides tutorial and reference books for OpenGL The Library enables programmers to gain a practical understanding of OpenGL and shows them how to unlock its full potential Originally developed by SGI the Library continues to evolve under the auspices of the OpenGL Architecture Review Board ARB Steering Group now part of the Khronos Group an industry consortium responsible for guiding the evolution of OpenGL and related technologies

**OpenGL Programming Guide** Jackie Neider, Tom Davis, Mason Woo, OpenGL Architecture Review Board, 1993 This book explains how to create graphics programs using OpenGL Release 1 It presents the overall architecture of OpenGL and discusses in detail every function included in the specification Numerous programming examples in C show how to use OpenGL functions     [OpenGL Programming Guide](#) ,1999     **OpenGL Programming for the X Window System** Mark J. Kilgard, 1996 SGI's X Windows graphics expert explains how to construct real and useful 3D applications using OpenGL and X and how to tightly integrate OpenGL applications with the X Window System Using the OpenGL Utility Toolkit GLUT to show how OpenGL programs can be quickly constructed the book explores OpenGL features using examples written in GLUT

**OpenGL Programming Guide** Mason Woo, Jackie Neider, Tom Davis, OpenGL Architecture Review Board, 1997 Explaining how graphics programs using Release 1.1 the latest release of OpenGL this book presents the overall structure of OpenGL and discusses in detail every OpenGL feature including the new features introduced in Release 1.1 Numerous programming examples in C show how to use OpenGL functions Also includes 16 pages of full color examples     [OpenGL Programming Guide](#) ,1997     **Forthcoming Books** Rose Arny, 2003-04     **OpenGL Programming Guide** Dave Shreiner, Randi J. Rost, OpenGL Architecture Review Board, OpenGL Architecture Review Board Staff, 2006



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